



BASIC PSYCHOLOGICAL NEEDS SATISFACTION, ACADEMIC PERFORMANCE: MEDIATING ROLE OF MOTIVATION

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ABSTRACT

The self-determination theory (Ryan & Deci, 2000), states that an individual has innate basic psychological needs, which are constantly moving towards self-fulfillment. Self-motivation along with basic psychological needs affect the academic performance of an individual. The focus of this study was to understand whether intrinsic, extrinsic or amotivation played the role of mediators in the relationship between basic psychological needs satisfaction and academic performance. The basic psychological needs satisfaction-general and the academic motivation scale were administered. The academic performance was measured by scores of the participant on the I.C.S.E. The data was analyzed using correlation and regression analysis. The results showed that none of the three motivation sub types, mediated the relationship between basic psychological needs satisfaction and academic performance. However, basic needs satisfaction was positively related to intrinsic motivation and negatively to amotivation, providing partial support to the SDT.

KEYWORDS: intrinsic motivation, extrinsic, amotivation, and academic performance.

Introduction

The self determination theory is a macro theory proposed by Deci and Ryan (1985, 2000). The theory in its initial stages considered intrinsic motivation as the only dimension of motivation, but with time and many studies conducted thereafter, the theory evolved and included other dimensions of motivation as well, such as extrinsic motivation and amotivation. The three dimensions of motivation are arranged in a continuum such that amotivation is the lowest form of motivation followed by extrinsic motivation and then, intrinsic motivation (Ryan & Deci, 2000; Deci & Ryan, 2000). The theory essentially revolves around how socio-cultural aspects affect an individual's motivation. Socio-cultural aspect of an individual affects the three innate basic psychological needs, the satisfaction or thwarting of these needs impacts the motivation of an individual (Ryan, 1995). The level of satisfaction of basic psychological needs facilitates the growth in the levels of motivation (Podlog, et al., 2015; Niemiec & Ryan, 2009). They also help in the maintenance of the level of motivation of an individual. Basic psychological needs comprises of the needs for autonomy, competence, relatedness (Deci & Ryan, The "What" and "Why" of Goal Pursuits: Human Needs and the Self Determination of Behaviour, 2000). Motivation is divided into a continuum; the level of satisfaction of basic psychological needs determines the level of motivation of an individual (Ryan 1995). A higher level of satisfaction of basic psychological needs leads to a higher level of motivation i.e. moving from amotivation to extrinsic motivation and then, to intrinsic motivation (Vansteenkiste, et al., 2007; Edmunds, Ntoumanis, & Duda, 2006; Gagné, Ryan, & Bargmann, 2003; Dickinson, 1995).

Self determination theory also lays emphasis on motivation and its relationship with performance. It proposes that levels of motivation, themselves, have an impact on performance. Intrinsic motivation is known to be the best predictor of performance (Edrak, Yin-Fa, Gharleghi, & Seng, 2013; Teixeira, Carraçal, Markland, Silva, & Ryan, 2012) followed by extrinsic motivation and amotivation (Ayub, 2010; Vallerand, et al., 1992). The self determination theory proposes, four types of extrinsic motivation and postulates that if the extrinsic motivation of the student is more autonomous and is more internalized then the student will have a better learning outcome and have a much more effective academic outcome (Niemiec & Ryan, 2009). Therefore, it can be concluded that both intrinsic as well as extrinsic motivation positively impacts the academic performance of a student (Ayub, 2010), except that the more autonomous the motivation of the student the longer the duration of motivation.

A study was conducted to compare the relationship of intrinsic motivation and extrinsic motivation with academic achievement of Indian adolescents living in Canada and India and the results showed that intrinsic motivation was a predictor of greater academic achievement and that this was higher for the Indian adolescents living in Canada than the Indian adolescents living in India. The results also showed that Indian adolescents were more extrinsically motivated than their counterparts residing in Canada. However, extrinsic motivation was a negative predictor of academic achievement for Indian adolescents living in Canada and it was not a significant predictor of academic achievement for Indian adolescents living in India (Areepattamannil, Freeman, & Klinger, 2011). In the light of these studies we can quite clearly see the gap in literature when it comes to the knowledge of what kind of motivation is required by an Indian student for him/her to perform better at academics and whether extrinsic motivation has a role to play in the relationship.

Basic psychological needs satisfaction, apart from having an influence on motivation, also has an impact on performance. A higher level of satisfaction of basic psychological needs leads to a higher level of performance (Niemiec & Ryan, 2009). In the work setting it has been found that the satisfaction of basic psychological needs impacts the performance evaluations and psychological adjustment of the employees (Baard, Deci, & Ryan, 2004). Emotional well-being in daily activities was related to the satisfaction of the basic psychological needs (Reis, Kennon, Gable, Roscoe, & Ryan, 2000). The three basic psychological needs of autonomy, competence, and relatedness share a significant relationship with academic performance (Hashemian & Soureshjani, 2011; Bao & Lam, 2008). It can be inferred that basic psychological needs satisfaction is related to motivation as well as other variables.

The relationship between basic needs satisfaction and academic performance may not be as straight-forward, because basic psychological needs also influence the motivation levels and motivation itself, has an effect on performance. Hence, it is apparent that the two factors, basic psychological needs and motivation affect academic performance and that there exists a relationship between basic psychological needs and motivation (Deci & Ryan, 2000). Therefore, it is of importance to know whether the three types of motivation play the role of mediators in the relationship between basic psychological needs satisfaction and performance of any kind.

Podlog, et al., (2015) conducted a study on needs satisfaction, motivation and engagement among high performing youth athletes, the findings of which showed that motivation and its subtypes do play a mediating role in the relationship between needs satisfaction and engagement level. The result is in congruence with the self determination theory. The purpose of this study was to evaluate whether intrinsic, extrinsic and amotivation play the role of mediators in the relationship between basic psychological needs and academic performance.

Operational Definitions

Predictor Variable

Basic psychological needs are innate needs that are prevalent in every individual. These needs are universal and impact our daily lives such that their satisfaction or thwarting of these needs can lead to better or worse performance, respectively. According to the self determination theory, basic psychological needs are always looking to gain satisfaction and the overall level of satisfaction of basic psychological needs is dependent on the cumulative satisfaction level of its three needs of autonomy, competence, and relatedness (Deci & Ryan, The "What" and "Why" of Goal Pursuits: Human Needs and the Self Determination of Behaviour, 2000).

Mediating Variable

Motivation is a process where the individual initiates and maintains a behavior that is goal directed. According to the self determination theory, motivation is divided into intrinsic, extrinsic motivation and amotivation.

Intrinsic Motivation is defined as the inherent drive to complete a task, or behavior because it is internally satisfying. It is the desire to learn or know about an activity because this experience is internally rewarding.

Extrinsic Motivation is defined as the motivation where an individual completes a task because of an outcome or reward that is external to him/her. It is the type of

motivated behavior where any behavior is always done to satisfy some external agency.

Amotivation is defined as the lack of motivation to complete a particular behavior or activity.

Outcome Variable

Academic Performance is the capability that a student has in terms of his academics which is represented in terms of the aggregate of the I.C.S.E marks. This measurement was chosen as it is a standardized measure.

Hypotheses

1. Basic psychological needs satisfaction would be positively related to intrinsic motivation.
2. Basic psychological needs satisfaction would be positively related to extrinsic motivation.
3. Basic psychological needs satisfaction would be negatively related to amotivation.
4. Intrinsic motivation would be positively related to academic performance.
5. Extrinsic motivation would be positively related to academic performance.
6. Amotivation would be negatively related to academic performance.
7. Basic psychological needs satisfaction would be positively related to academic performance in all three mediation models.
8. Intrinsic motivation would mediate the relationship between basic psychological needs satisfaction and academic performance.
9. Extrinsic motivation would mediate the relationship between basic psychological needs satisfaction and academic performance.
10. Amotivation would mediate the relationship between basic psychological needs satisfaction and academic performance.

Materials and Methods

Sample

The sample for the study comprised of students who had successfully passed their I.C.S.E examination in 2015. The I.C.S.E was a criterion for the study because it provides standardization in the marks obtained by the student as it is an all India examination conducted by the I.C.S.E board. The exam is corrected by teachers across the country and the answer scripts are distributed to teachers for correction such that they are varying in their regions compared to the school of the student, hence, removing any bias that might be attributed. Moreover, the names, sex, age, religion, caste etc are not mentioned on the answer scripts, further providing avenue for having a more neutral standpoint.

Inclusion criteria

1. The sample consisted of boys and girls who had successfully passed their I.C.S.E in the year 2015.
2. The age group of the students considered for the study was between the ages of 14 and 18 years.
3. They would also have to have passed their I.C.S.E in their first attempt as it keeps the students on the same level as prior experience could have caused a change in the results.
4. The students all passed the I.C.S.E with English as their medium of answering, this was an inclusion criterion to keep the students on the same plane and moreover, it was easier for the researcher to find I.C.S.E schools with their first language as English.
5. Only students who had taken tuitions for the I.C.S.E were taken for the study. Tuitions were taken as an inclusion criterion to level the socio economic status of the students and the resources which might have played a role in their performance.

The sampling technique that was used by the researcher was the convenient sampling method. The participants were selected from schools and junior colleges, provided they fulfilled the inclusion and exclusion criteria. A total of 155 students filled in the questionnaires but only 124 selected for participation in the research. Both males (N = 73, Mean age = 16.25, SD = .61) and females (N = 51, Mean age = 16.29, SD = .54) participated in the study. These 31 participants were rejected due to various reasons such as absence of signatures in the consent form, or certain items in the two questionnaires were left unfulfilled or the relevant information was not provided for in the demographic data sheet.

Research Design

The research was quantitative in nature and every variable had a corresponding questionnaire. All variable scores were continuous in nature. The study analyzed the data with correlation and then, mediation was checked using Process v2.13 (model 4; Hayes, 2012).

Tools

1. Basic Needs Satisfaction in General Scale
2. Academic Motivation Scale- High school version (Vallerand R. J., et al., 1992)
3. Academic Performance ICSE scores in 2015

Statistical Analysis

Correlational analysis was conducted; following which mediation analysis was conducted using Process v2.13 (model 4; Hayes, 2012). Mediation was measured using Process by Andrew Hayes, as it is a non parametric method of checking mediation as it employs bootstrapping as a technique. Since the sample of the study was relatively less, bootstrapping was done for 5000 samples at 95% confidence interval.

Results

Descriptive statistics

Participants were selected from one junior college in Bangalore, one school from Siliguri and one school from Gangtok. Only students in the 11th standard or first year pre-university participated in the research.. The descriptive statistics of the variables are presented in table 1. The cronbach alpha of basic needs satisfaction was .75, intrinsic motivation was .84, extrinsic motivation was .84, amotivation was .85.

Table 1 Representing Mean and Standard Deviation of the variables

	Mean	Std. Deviation
BPNS_N	4.78	.67
IM	4.55	1.05
EM	4.87	1.08
AM	2.03	1.25
I.C.S.E Marks	82.74	7.60
N = 124		

Inferential statistics

Table 2 represents the correlational matrix. Basic psychological needs satisfaction was found to share a significant positive correlation with intrinsic motivation ($r = .39, p < .01$), amotivation was found to have a significant negative correlation with basic psychological needs satisfaction ($r = -.30, p < 0.1$). This relationship between the two forms of motivation and basic psychological needs satisfaction was congruent with the self determination theory and other studies (Deci & Ryan, 2006; Podlog, et al., 2015). None of the variables was found to have a significant relationship with I.C.S.E marks.

Table 2 Representing Correlations between basic psychological needs satisfaction, intrinsic, extrinsic, amotivation and I.C.S.E marks, N=124

	1	2	3	4	5
BPNS (1)	1				
Intrinsic motivation (2)	.39**	1			
Extrinsic motivation (3)	-.05	.38**	1		
Amotivation (4)	-.30**	-.22*	.02	1	
I.C.S.E Marks (5)	-.01	-.02	-.09	-.11	1

Note: coefficient alphas are reported on the diagonal

* $p < .05$. ** $p < .01$.

Mediation analysis was conducted despite not having significant correlations across the variables. Mediation was measured using process v2.13 (model 4; Hayes, 2012)

For the study, model 4 of process was used for analyzing the mediating role of the three types of motivation in the relationship between basic psychological needs and academic performance. Therefore, a separate mediation analysis was used for each of the three mediating variables at bootstrap levels of 5000 samples.

Mediating effect of intrinsic motivation

There was a significant positive relationship between basic psychological needs satisfaction and intrinsic motivation ($a = .64, 95\% \text{ CI } [.41, .86], t = 5.61, p < .01$). H1 was accepted. However, intrinsic motivation did not significantly predict academic performance while controlling for basic psychological needs satisfaction ($b = -.40, 95\% \text{ CI } [-1.82, 1.01], t = -.55, p = .57$). H4 was rejected. The results also

showed that basic psychological needs satisfaction had no significant indirect effects on academic performance through intrinsic motivation ($ab = -.25$, 95% CI $[-1.09, .55]$). H8 was rejected. Basic needs satisfaction was not significantly related to academic performance, controlling for intrinsic motivation ($c = -.08$, 95% CI $[-2.29, 2.13]$, $t = -.07$, $p = .94$). H7 was rejected in model 1. The individual regression scores along with the model are shown in figure 1. The total, direct and indirect effect scores are mentioned in Table 4 with the beta scores and the lower and upper continuous interval. None of the three values are significant at the $p = 0.5$ value.

Table 4 Representing Mediation Effect of Intrinsic Motivation on the Relationship between Basic Psychological Needs Satisfaction (BPNS) and Academic Performance (ICSE), N = 124

Effect	b	95% CI	
		Lower	Upper
Total	-.33	-2.34	1.67
Direct	-.08	-2.29	2.13
Indirect(mediation)	.10	-.09	.70

Mediating effect of extrinsic motivation

No significant relationship was found between basic psychological needs satisfaction and extrinsic motivation ($a = -.11$, 95% CI $[-.40, .16]$, $t = -.80$, $p = .42$). H2 was rejected. Extrinsic motivation did not significantly predict academic performance while controlling for basic psychological needs satisfaction ($b = -.93$, 95% CI $[-2.18, .32]$, $t = -1.46$, $p = .14$). As a result, H5 was rejected. The results also showed that basic psychological needs satisfaction had no significant indirect effects on academic performance through intrinsic motivation ($ab = .11$, 95% CI $[-.10, .70]$). H9 was rejected as well. Basic needs satisfaction was not significantly related to academic performance, while controlling for extrinsic motivation ($c = -.44$, 95% CI $[2.45, 1.55]$, $t = -.44$, $p = .66$). H7 was rejected for model 2. The individual regression scores along with the model are shown in figure 2. The total, direct and indirect effect scores are mentioned in Table 5 with the beta scores and the lower and upper continuous interval. None of the three values are significant at the $p = 0.5$ value.

Table 5 Representing Mediation Effect of Extrinsic Motivation on the Relationship between Basic Psychological Needs Satisfaction (BPNS) and Academic Performance (ICSE), N = 124

Effect	b	95% CI	
		Lower	Upper
Total	-.33	-2.34	1.67
Direct	-.44	-2.45	1.55
Indirect(mediation)	.11	-.010	.70

Mediating effect of amotivation

There was a significant negative relationship between basic psychological needs satisfaction and amotivation ($a = -.50$, 95% CI $[-.82, -.18]$, $t = -3.11$, $p < .01$). H3 was accepted. However, amotivation did not significantly predict academic performance while controlling for basic psychological needs satisfaction ($b = -.33$, 95% CI $[-1.46, .79]$, $t = -.48$, $p = .55$). H6 was rejected. The results also showed that basic psychological needs satisfaction had no significant indirect effects on academic performance through amotivation ($ab = .17$, 95% CI $[-.24, .97]$). H10 was rejected. Basic needs satisfaction was not significantly related to academic performance, while controlling for amotivation ($c = -.50$, 95% CI $[-2.60, 1.58]$, $t = -.48$, $p = .63$). H7 was rejected for model 3. The individual regression scores along with the model are shown in figure 3. The total, direct and indirect effect scores are mentioned in Table 6 with the beta scores and the lower and upper continuous interval. None of the three values are significant at the $p = 0.5$ value.

Table 6 Representing Mediation Effect of Amotivation on the Relationship between Basic Psychological Needs Satisfaction (BPNS) and Academic Performance (ICSE), N = 124

Effect	b	95% CI	
		Lower	Upper
Total	-.33	-2.34	1.67
Direct	-.50	-2.60	1.58
Indirect(mediation)	-.17	-.23	1.01

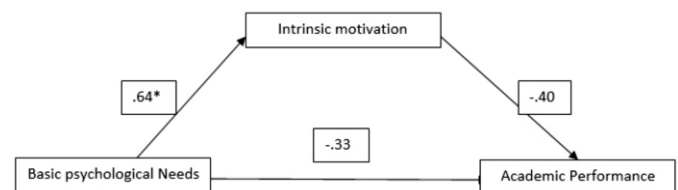


Figure 1 Representing Mediation Effect of Intrinsic motivation on the Relationship between Basic Psychological Needs Satisfaction (BPNS) and Academic Performance (ICSE), N = 124

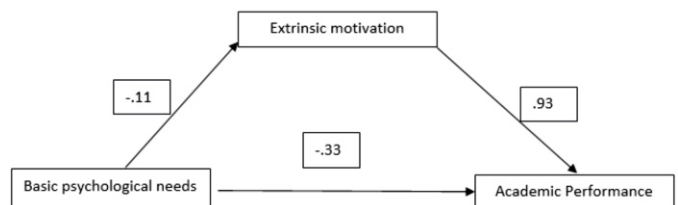


Figure 2 Representing Mediation Effect of Extrinsic motivation on the Relationship between Basic Psychological Needs Satisfaction (BPNS) and Academic Performance (ICSE), N = 124

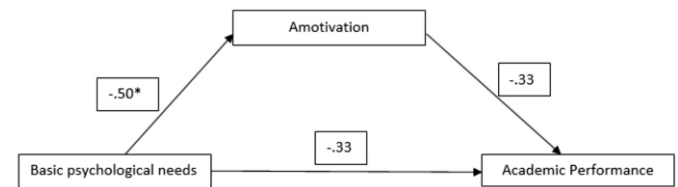


Figure 3 Representing Mediation Effect of Amotivation on the Relationship between Basic Psychological Needs Satisfaction (BPNS) and Academic Performance (ICSE), N = 124

DISCUSSION

The aim of the present study was to investigate the mediating role of intrinsic, extrinsic and amotivation on the relationship between basic psychological needs satisfaction and academic performance. According to the self determination theory, all three dimensions of motivation (intrinsic motivation, extrinsic motivation and amotivation) are affected by basic needs satisfaction and both these variables have individual influences on performance, implying the role of motivation as a mediating variable (Podlog, et al., 2015). Basic psychological needs satisfaction was measured as a composite score rather than by its specific domains, as overall satisfaction of needs is a more holistic view towards the satisfaction of basic needs rather than considering separate subscales.

The motivation levels of the students were taken 7 months after their performance in their I.C.S.E. This was a limitation faced of the study due to time constraints faced by the researcher. However, it is acknowledged that the motivation levels in childhood strengthen as one grows older, making it more pervasive (Lai, 2011).

The results of the study showed that basic psychological needs satisfaction positively predicts intrinsic motivation. This result was in support of the self determination theory proposed by Deci and Ryan (2000), which states that the higher the basic psychological needs satisfaction, the more a person is intrinsically motivated (Vansteenkiste, et al., 2007; Gagné, Ryan, & Bargmann, 2003). Basic psychological needs satisfaction did not share a significant relationship with extrinsic motivation. This result might have been affected due to the fact that extrinsic motivation has a broader frame work, according to the organismic theory of motivation (Deci & Ryan, 2000). Extrinsic motivation is a range which begins from the most external form of motivation to the least external form of motivation, thus, adding the dimension of more autonomous motivation style. This broad range might have affected the relationship as it becomes inconclusive to say whether extrinsic motivation would be negatively or positively predicted by basic psychological needs. Perhaps, the measurement of the subscales of extrinsic motivation would shine some light on these findings. Amotivation was negatively predicted by basic needs satisfaction. These results indicate that if the basic psychological needs are satisfied the student will be more autonomous in their motivation levels.

None of the three dimensions of motivation showed any significant relationship with academic performance. This result was in stark contrast to the self determination theory, which proposes that intrinsic motivation and extrinsic motivation has a positive impact on performance while amotivation is negatively related. Moreover, the findings also suggest that there exists no significant relationship between basic psychological needs satisfaction and academic performance, this result, too, was in contrast to the self determination theory. The results indicate

that none of the three dimensions of motivation mediate the relationship between basic psychological needs satisfaction and academic performance.

In light of these results and their contrast to the theory, the researcher conducted a few post hoc analyses with the separate subscales of basic psychological needs satisfaction. The post hoc analysis was conducted to verify whether the overall measure of basic needs satisfaction was responsible for the non significant relationship with academic performance or whether the choice of measure of academic performance was responsible for the non significant results with the other variables. Regression analysis was conducted between the subscales of basic psychological needs satisfaction (autonomy, competence and relatedness) and academic performance, through the three dimensions of motivation.

A significant positive relationship was found between autonomy and intrinsic motivation ($a = .34$, 95% CI [.15, .52], $t = 3.56$, $p < .01$), no significant relationship was found between autonomy and extrinsic motivation ($a = -.16$, 95% CI [-.36, .05], $p = .14$) and autonomy negatively predicted amotivation ($a = -.37$, 95% CI [-.61, -.14], $t = -3.13$, $p < .01$). Competence positively predicted intrinsic motivation ($a = .55$, 95% CI [.28, .83], $t = 3.98$, $p < .01$, extrinsic motivation ($a = 1.10$, 95% CI [.93, 1.24], $t = 13.96$, $p < .01$) and amotivation ($a = .61$, 95% CI [.35, .88], $t = 4.62$, $p < .01$). Relatedness significantly positively predicted intrinsic motivation ($a = .84$, 95% CI [.72, .96], $t = 13.76$, $p < .01$) and extrinsic motivation ($a = .55$, 95% CI [.40, .70], $t = 6.98$, $p < .01$), while it was not significantly related to amotivation ($a = -.02$, 95% CI [-.28, .24], $t = -.17$, $p = .86$). The most important aspect of these results was that none of the three subscales of basic psychological needs significantly predicted academic performance i.e. autonomy to academic performance ($a = -.46$, 95% CI [-2.31, 1.39], $t = -.49$, $p = .62$), competence to academic performance ($a = -.23$, 95% CI [-2.07, 1.60], $t = -.25$, $p = .80$), and relatedness to academic performance ($a = -.55$, 95% CI [-1.87, .76], $t = -.83$, $p = .40$) indicating that the measure used to calculate academic performance may be inappropriate.

The I.C.S.E marks could be considered unsuitable as a measure for calculating the academic performance, as 98.49% of students who appeared for the exam, managed to pass the examination in 2015 (Financial Express, 2015), thus, reducing the range of marks in the variable that can be calculated. The passing marks are 40%, thus reducing the sample range from 0-100 to 40-100. This means that there would be a reduction in the correlational range of academic performance as most students would pass the examination, reducing the number of students who have failed the examination, who would, presumably, have had varied levels of motivation and basic psychological needs satisfaction. Moreover, the other major problem with using I.C.S.E marks as a measure of academic performance is that it is a one-time examination given for 7 subjects over a period of almost one month. This measure does not provide us with an overall picture of a student's performance over a period of time. Rather, it represents the student's performance on a specific examination.

The I.C.S.E marks were self reported by the students on the demographic data sheet. These scores were not cross checked with the school authorities and as such one can never be sure of the scores of the participants and that may have played a role in the results.

Apart from the academic performance measure, there might have been other factors or variables influencing the academic performance, rather than self-motivation of the students. The importance of self motivation in a student may not be as significant as is the importance of parental expectation or support, for example. Many studies also look at how teachers support and the perception of the same can impact a student's motivation and in turn affect their performance (Wentzel & Wigfield, 1998; Zhou, Ma, & Deci, 2009; Assor, Kaplan, Kanat-Maymon, & Roth, 2005). The same is true for parental support and the student's perception of the support (Bao & Lam, 2008; Chirkov & Ryan, 2001).

The results showed partial support for the self determination theory such that basic psychological needs satisfaction successfully predicted two dimension of motivation and with the post hoc analysis it revealed that competence and relatedness both positively predicted extrinsic motivation, providing further support for the self determination theory. The results also provided an avenue to probe whether I.C.S.E marks are a suitable measure for academic performance.

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